Space Weather Forecast

Issued on Sunday, 31 December 2023 at 01:22 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of Moderate flares. Slight chance Minor storms from coronal hole fast wind onset day 2 (1st Jan).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with occasional common class flares, the largest from a sunspot region that is over the western solar horizon. There are a total of four sunspot regions on the disc, with the most significant region in the southeast, small but magnetically moderately complex. This region was the source of some small common-class flaring. The remaining regions are magnetically simpler and either stable or weakly decaying.
There were several coronal mass ejections (CMEs) observed through the period, and most have been analysed as missing Earth. However, a small CME from a Common-class flare may give Earth a weak glancing blow, but outside of the forecast period as the CME is so slow. There are notable filaments (lines of plasma held by the Suns magnetic field) on the Earth-side of the Sun, including a large mobile filament in the northwest. However, these are mainly rotating towards the western horizon with a lowering chance of any Earth-directed eruption a 'filament' eruption.

Solar Wind / Geomagnetic Activity: Initial residual weak CME influences quickly faded. Background wind speeds were observed, initially between 350-400 km/s but ending the day around 335 km/s. The strength of the solar wind's magnetic field started at moderate levels before easing to become weak. The north-south component was weak throughout, mainly positive (northward) but with brief rotations to negative (southward). Geomagnetic activity remained Quiet.

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) persisted at background, with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is expected, but with a chance of rising to Moderate with isolated M-flares possible, especially later in the period when a returning region is likely to arrive.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs within the forecast period. Slow wind conditions are expected until the arrival of the fast wind from a coronal hole feature. Elevated winds are forecast, around 500-550km/s, and likely persisting through day 3 (2nd Jan). Quiet geomagnetic activity at first, becoming Unsettled tomorrow with a chance of Active intervals and a slight chance of an isolated Minor Storm interval from the fast wind onset. Activity easing to Quiet with a chance of Unsettled intervals day 3 (3rd Jan) and then back to predominantly Quiet activity for day 4 (4th Jan).

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) is expected to persist at background, with no Solar Radiation Storms occurring.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	20	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	25	25	25
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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